

ON A CESTODE FROM *DACELO GIGAS*, BODD.

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By T. HARVEY JOHNSTON, M.A., B.Sc., Parasitologist, Bureau  
of Microbiology, Sydney; Hon. Zoologist, Australian  
Museum.

(Plate lxx.).

My friend, Mr. S. J. Johnston, of the Biology Department, Sydney University, recently handed over to me a collection of Entozoa, mainly Cestoda, collected by himself and Professor J. P. Hill. The specimens now to be described were obtained from the stomach of a Laughing Jackass (*Dacelo gigas*, Bodd.) at Gloucester, New South Wales. Tapeworms do not commonly occur in the stomach, most of them preferring the alkaline conditions and abundant food supply present in the duodenum.

The largest specimen is about one hundred and twenty millimetres long and consists of approximately four hundred and twenty proglottids. Just behind the scolex, the breadth is 0.3 mm., gradually increasing to two mm. at about one third of the total length of the strobila, the remaining segments being practically uniform (2.5 mm.) In flattened and mounted specimens the dimensions are increased.

A neck is hardly recognisable, as constrictions appear marginally immediately behind the scolex and segmentation is distinctly seen in the strobila one millimetre from the head. There is no marked constriction between the scolex and the strobila.

There is very little overlapping of the anterior edges of segments by the posterior parts of those in front of them, nor is there much lateral projection. Excepting in the anterior fifth or quarter of the chain, there is not much difference in the size of the segments, the ripe and the sexually mature proglottids measuring about two to two and a-half millimetres in width by 0.7 to 0.8 mm. in breadth. They are thus from three to four times as broad as long. Those near the scolex are 0.4 mm. long by 0.3 mm. broad, the succeeding segments gradually broadening.

There is no marked narrowing or lengthening at the posterior end of the chain, the last segments being only a little longer and slightly narrower than those further forward.

The scolex is somewhat rounded, but its width is greater than its length, that is if the rostellum be not included as it may be retracted (Pl. lxx., fig. 1.) Its size in this latter condition is about 0.45 mm. broad by 0.31 mm. long. It is thus only a little wider than the anterior segments. The retractile rostellum is 0.14 mm. long, its base being about 0.05 mm. in breadth, the whole structure being short and conical.

Near its apex, there is borne a single circlet of from thirty to thirty-six hooks, all similar in shape and size, and measuring about 0.05 mm. in length. They are so closely arranged that there is difficulty in accurately determining their number, arrangement and structural details. Their curvature is slight. The apical attachment is long and apparently rather pointed, the posterior attachment being short and blunt and rounded. The free end is short and pointed. A cavity is present (Pl. lxx., fig. 2). The apices of the hooks do not reach the summit of the rostellum. An apical muscle plug is absent.

The scolex bears four typical suckers which are unarmed and possess fairly prominent rims. The cavity of each is nearly spherical, the internal diameter being almost 0.1 mm. The openings are directed more towards the front than towards the sides. Two suckers lie on each surface, *i.e.*, two dorsal and two ventral. Their musculature is well developed (Pl. lxx., fig. 1).

The cuticle is well defined and smooth. A basement membrane is hardly distinguishable and sub-cuticular muscle fibres are not well developed. The medulla occupies the middle third of the thickness of the parenchyma. The cortex contains abundance of calcareous corpuscles, especially in the neck region. They are absent in the scolex. Their shape is rounded or elliptical, the size varying from 0.003 to 0.008 mm. in diameter.

The musculature of the cortex is strongly developed. The longitudinal muscles are disposed in two concentric sets of bundles, numbering about seventy altogether. The inner set consists of smaller and fewer bundles than the outer. The inner masses are generally opposite the outer, rather than alternating with them. Laterally these muscles-bundles are very small and numerous, being separated by the fibres of the transverse muscles, which lie within the longitudinal but pass out laterally to the cuticle. These transverse fibres are poorly developed so that it is difficult to exactly define the limits of the cortex and

medulla. The dorsoventral fibres are more distinct and pass between the longitudinal bundles and through the medulla.

The nervous system is not well marked. There appears to be only one longitudinal fasciculus, this being situated on the outer side of each main longitudinal excretory vessel. I cannot make out the various concomitant fasciculi described in some *Tæniadæ*.

The excretory system consists of the usual parts. The outer longitudinal vessel has a much wider lumen than the inner one, the former representing the dorsal and the latter the ventral vessel. Their relative position varies somewhat in the segments but the inner trunk is generally placed more ventrally. Connecting the outer trunks, there is in the posterior part of each proglottis, a wide transverse commissural canal. There do not appear to be any valves present.

Of the genital system, the earliest trace appears in about the sixtieth segment, as a cord of cells representing the rudiments of the cirrus sac and vas deferens. The testes are well developed in the hundredth. Meanwhile, the vitelline gland, ovary and vagina have made their appearance. In the next eighty proglottids both sexes are mature. Beyond this the testes disappear rapidly, the segments becoming full of developing ova. The final proglottids are densely crowded with eggs containing hexacanth embryos (onchospheres).

The genital apertures are marginal and unilateral, being on the right side. Very rarely there may be an opening on the left instead. There is no genital eminence, the position of the aperture only being visible in stained and mounted preparations unless the cirrus be more or less everted. It is situated near the junction of the anterior third and posterior border of the overlapping portion of the preceding segment.

The testes are situated in a single layer lying nearer the dorsal surface. They gradually increase in number, the more anterior segments possessing about fifty, later segments about sixty. They are thus fairly numerous. Their shape is subspherical, the average diameter being about thirty-seven micra. They are well within the medulla and occur more abundantly in the middle and posterior region of each proglottis, comparatively few being present in the anterior third. Arising from each testis is a rather strong vas efferens which joins with others to form the vas deferens at about the middle of the anterior part of the segment, in front of the ovary. This passes on laterally towards the right, becoming enlarged and coiled near the neighbourhood of the excretory vessels. It is here strongly muscular. After passing

ventrally to both excretory vessels and the longitudinal nerve, it enters the posterior end of the cirrus sac.

This sac is thick-walled and muscular. It does not contain a vesicula seminalis, but that part of the vas deferens which lies within it, is again considerably coiled. In some segments the sac was partly everted, resembling a short cylinder fifty-seven  $\mu$  long by fifty  $\mu$  broad; and in one case (Pl. lxx., fig. 4) the cirrus seen projecting under compression at the end of the cylinder was as a delicate transparent tube twenty-eight  $\mu$  long by eight  $\mu$  in diameter. There was no trace of spines on it. There is a strong sphincter at the external opening of the cirrus sac.

The vagina is a delicate tube lying immediately behind and below the vas deferens, the course of the two ducts being generally parallel. It opens externally into the genital cloaca just behind the cirrus sac. In mature segments the vagina proceeds inwards for a short distance ventrally to both excretory canals, becoming gradually enlarged to form the elongated, thin-walled, pyriform receptaculum seminis. Masses of sperms were present in the structure. From its inner broad end there courses inwards and backwards a narrow somewhat coiled tube, the fertilisation duct, which possesses well-developed walls. The common oviduct enters this duct, the ova become fertilised here and are carried onwards to receive the secretions from the vitelline and shell glands before entering the uterus.

The ovary is a small organ situated in the anterior part of the segment, at about its middle, though in young proglottids, it is nearer the edge bearing the genital pore. It is not distinctly bilobed, but consists of a number of short tubular glands slightly divided into two masses. The products are discharged ultimately into the short common oviduct. This joins the fertilising duct. I could not detect paired oviducts. The ovary, as a whole, is rather rounded, extending dorso-ventrally as well as posteriorly, the common duct being surrounded by it during most of its course.

The vitelline gland is small, slightly bilobed and transversely elongated. Its duct joins the fertilising duct after the union of the oviduct with the latter. The shell gland is very small and not easily distinguishable. It appears to me to lie between the vitelline gland and the ovary. The whole female complex is so small and crowded that the details are not as satisfactorily followed out as I would wish.

It seems as if the uterus arises as a tube, the continuation of the fertilising duct. This gives off very numerous, narrow, branching diverticula, which come to surround the testicular



vesicles as in *Dipylidium caninum*, Linn. These pouches become filled with ova, and lose their connection with the rest of the female system by the abortion of the uterus. Thus the ova are seen in section in small groups lying in a small capsule in the parenchyma. The testes have become atrophied long before this, the cirrus sac being the only male structure still persisting. The segment becomes so full of eggs that not only is the medulla crammed with them, but the lateral fields becomes almost obliterated, ova being present laterally beyond the excretory canals close up to the cuticle. The longitudinal muscle bundles persist in ripe segments.

The eggs are spherical, excepting where crowded, and then they become polygonal through mutual pressure. Two shells are present and are fairly widely separated. The diameter of the embryo is eighteen  $\mu$ , that of the outer shell being twenty-six  $\mu$ . The arrangement of the hooklets in the onchosphere is illustrated on Pl. lxx., fig. 8. Each hooklet is 0.017 mm. long and appears to possess a slightly swollen extremity.

The Cestode belongs to the family of Dilepinidæ and to the sub-family Dipylidiinæ (Prof. Fuhrmann's<sup>1</sup> classification, 1908). Its characters are such that they may be regarded as belonging to a new generic type. I accordingly propose the name *Similuncinus daceionis*, gen. et. sp. nov., the generic name referring to the possession of hooks all similar in shape.

The characters of the proposed genus may be stated provisionally, as follows:—Retractile rostellum bearing a single circlet of uniform hooks; four unarmed suckers; unilateral genital pores; genital papilla not prominent; single genitalia; numerous testes mainly situated behind the ovary; ovary in the anterior part of the segment; uterus a reticulum surrounding the testes at first, but afterwards becoming aborted so that the eggs lie in the masses surrounded by the parenchyma; the genital ducts pass ventrally to longitudinal nerve and excretory canals.

This new genus would differ from *Dipylidium*, R. Lekt., in possessing only one row of uniform hooks and single genitalia; from *Monopylidium*, Fuhrmann, in the structure of the rostellum and the position of the sex canals in regard to the excretory system; from all genera in the sub-family Dilepininæ in the character of the uterus.

Type presented to the Trustees of the Australian Museum.

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<sup>1</sup> Fuhrmann—Die Cestoden der Vögel (Zool. Jahrb., x., Suppl. Bd., 1, 1908, p. 27).